

Underground Detention Systems



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General Description

Underground detention pipes, tanks and vaults are designed to fill with stormwater during large storm events and slowly release it over a number of hours. There are several components for these systems including: 1) drain inlet pipes, which convey stormwater into the detention facility; 2) detention chamber, which is the structure in which stormwater accumulates; and 3) outlet drain pipe, which is located at the downstream end of the detention chamber and restricts the flow out of the chamber. Underground detention systems are typically built under parking lots or other paved surfaces to provide peak runoff flow control and storage of stormwater for future release back into the environment. These systems can be constructed from steel, concrete or plastic materials.

Inspection/Maintenance Considerations

Once underground detention systems are installed, they require minimal maintenance. The detention chambers must be cleaned periodically to remove accumulated trash, sediment and other debris. Installation of catch basins at the inlet will reduce trash accumulation, but suspended solids will be carried into the detention chamber. All removed sediment and debris must be tested for hazardous characteristics and be properly disposed. If regular maintenance is not performed, accumulated sediment may cause noxious gases to form. Maintenance work in underground facilities requires special OSHA approved training and equipment for confined space conditions.

Maintenance Concerns, Objectives, and Goals

- Vector Control
- Sedimentation

Targeted Constituents

✓ Sediment	▲
✓ Nutrients	●
✓ Trash	●
✓ Metals	●
✓ Bacteria	●
✓ Oil and Grease	●
✓ Organics	●
✓ Oxygen Demanding	●

Legend (Removal Effectiveness)

- Low
- High
- ▲ Medium



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Inspection Activities	Suggested Frequency
<ul style="list-style-type: none"> ■ Inspect drain inlet and outlet for obstructions and debris to insure runoff can move freely into and out of detention chamber. 	Post-construction
<ul style="list-style-type: none"> ■ Inspect facility for floating debris, sediment buildup and accumulated petroleum products. ■ Detention chamber and pipe connections should be inspected for cracks or damage. 	Annual
Maintenance Activities	Suggested Frequency
<ul style="list-style-type: none"> ■ Remove sediment that has accumulated in detention chamber after construction in the drainage area is completed. 	Post-construction
<ul style="list-style-type: none"> ■ Remove, test and properly dispose of sediment and debris accumulated in drain inlet and outlet pipes and detention chamber. Sediment should be removed from detention chamber when it exceeds 10% of the storage area. 	Annual, or per manufacturer's recommendations
<ul style="list-style-type: none"> ■ Remove floating debris and accumulated petroleum products with appropriate equipment. ■ Seal all joints between tank and pipe sections ■ Remove obstructions from the inlet and outlet structures. 	Annual, or as needed

Additional Information

Underground detention systems are primarily designed to control storm water quantity and are typically installed with other water quality BMPs (i.e. sand filters) to improve water quality. Water quality benefits from detention systems alone occur primarily through the settling out of suspended solids in the detention chamber prior to the discharge of stormwater.

References

Operations, Maintenance, and Management of Stormwater Management Systems (Watershed Management Institute, Inc., 1997)

Stormwater Management Manual, Chapter 6, O & M Requirements, City of Portland, 2002.

Guidance on Selection of Stormwater Quality Control Measures, City of San Jose, Department of Planning, Building and Code Enforcement, 1998.

Storm Water Technology Fact Sheet. EPA 832-F-01-005, September 2001.